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AUTHOR Tomlinson, Peter D.
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ABSTRACT

This paper introduces the concept of radio-assisted practice (RAP) and outlines the nature and initial findings of a British research project which is investigating the potential of RAP in preservice teacher education. The paper falls into three main parts. The first situates matters in terms of information-processing skill (IPS) psychology and comments on its recent application to thinking about teacher expertise. It is also noted that recent work on professional competence, as well as student-teacher construals, corroborates the IPS implication that the development of teaching expertise requires meaningful classroom practice. Presenting RAP as an unobtrusive means of guidance using miniaturized radio communication during ongoing teaching, the second part of the paper distinguishes the technique from the concept and offers some principles and corresponding rules of thumb for "rapping." The third part describes and presents some preliminary results of an 18-month research project designed to assess the efficacy of RAP for student teachers and ways of initiating supervisors into RAP usage. A 17-item reference list is provided. (Author/RP)

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DEVELOPING TEACHING EXPERTISE WHERE IT MATTERS:

RADIO-ASSISTED PRACTICE AS AN APPLICATION OF SKILLS PSYCHOLOGY

Peter D. Tomlinson

School of Education
University of Leeds, UK

Paper to be presented at the 1987 Annual Meeting of the AERA
Washington, D.C.

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ABSTRACT

The major purposes of the present paper are to introduce the concept of radio-assisted practice (RAP) and to outline the nature and initial findings of a British research project[1] designed to evaluate its potential in initial teacher education. The paper falls into three main parts. The first situates matters in terms of the cognitive psychology of skill (IPS), commenting on its recent application to thinking about teacher expertise. Recent work on professional competence as well as student-teacher construals corroborate the IPS implication that the development of teaching expertise requires meaningful classroom practice. The second part of the paper presents RAP as an unobtrusive means of guidance during ongoing teaching using miniaturised radio communication, distinguishing the technique from the concept and offering some principles and corresponding rules of thumb for 'rapping'. The third part outlines an eighteen-month research project designed to assess the efficacy of RAP for student teachers and ways of initiating supervisors into RAP usage. Early results of this study are presented.

INTRODUCTION

The growing application of modern cognitive psychology to the study of teaching (cf. Doyle, 1979; Leinhardt and Greeno, 1986; Tomlinson and Smith, 1985) is to be welcomed in a variety of respects. From the applied perspective of educational research, it can surely only be a good thing that attention has been widened from the externalist focus of the process-product approach (cf. Shulman, 1986) to include attempts to get at the constituent processes between and within those involved in teaching (Clark and Peterson, 1986). From the perspective of psychological theory, the application of the dominant postwar paradigm of cognitive psychology (cf. Anderson, 1986; Eysenck, 1984) has long been overdue. Indeed, to anyone (like the present writer) initiated into academic psychology during that period, the delay has been surprising and worthy of historical study in its own right.

It must be pointed out, however, that it is not just a matter of cognitive psychology resourcing the study of teacher cognition in isolation, thereby fuelling some sort of Hegelian swing from external behaviour to inner mental life. Once again, this point can be made both in broad practical terms and by reference to the theoretical resource itself. Practically, what we are interested in is good, effective teaching: those of us involved in teacher education are professionally interested in how to develop good, effective teachers. Theoretically, modern cognitive psychology is a psychology of human action. Historically it was founded in an attempt to understand the nature of human skill, an enterprise in which it can claim a certain degree of success (cf. Gellatly, 1986). It has yielded a relatively complex view of humans as skilled information processors, as well as a range of insights into the acquisition of skill. In terms of relevance and scope, therefore, educationists contemplating information-processing skill (IPS) psychology will hopefully react with the old Lewinian dictum that "there is nothing so practical as a good theory".

The conception of skill emerging from IPS psychology is a relatively complex one, whose main features will now be rehearsed as a framework for subsequent situating of the concept of radio-assisted practice. Skills are activity competences and the activities instantiating them are:

(1) Purposive-interactive: They involve action adapted to bringing about goals within particular settings with varying contingencies. This requires anticipation as well as appropriate reaction, which in turn argues that skilled action must be based on internal schemes relating actions and representations of relevant external context. Such planfulness need not involve conscious representation and the skills they underlie may differ in a variety of ways.

One important dimension is openness-closedness: relatively closed skills deal with more predictable, well-defined, simple contingencies, action, open skills with less predictable, less definable, more complex, subtle demands. There will be no doubts about which end of this dimension skilled teaching occupies.

(2) Complex-coordinated: On close inspection, skilled performance is seen to be complex, involving many sub-actions. These are being carried out fluently, rapidly, often simultaneously, in coordination. The smooth easy performance of the expert belies this complexity, makes analysis difficult, and doubtless encourages the lay notion of skills as "natural inborn" capacities. But skills are also:

(3) Acquired: Skills involve competences to realise particular types of goals in particular ranges of circumstances, so their planfulness or knowledge base could hardly be innate. But the complexity, rapidity and simultaneity of the subprocesses involved are clearly beyond the basic information-processing capacities of humans, as specialist areas of cognitive psychology have revealed in considerable depth. Skill acquisition requires relatively complex learning involving various types of change in the learner. Generally speaking, to learn a skill one needs:

(a) to have a plan, a linked awareness of end and means;
(b) to make an attempt at applying this process plan;
(c) to obtain information on the degree of success of one's attempt that can be used to inform the next try. This feedback usually needs to be close in time to both.
(d) to do all of the above repeatedly, i.e. engage in what one might call "meaningful" or "reflective" practice, i.e. repeated planful attempts informed by relevant feedback.

This is illustrated diagrammatically in figure 1 further in the paper. What happens during skill acquisition is that the constituent information-processing becomes economised and automated. Economy is realised through cutting inefficient processes and compiling or "hierarchically chunking" the essential ones. The price of this increase in adaptive competence appears to be the loss of conscious access to the process, as increasingly large portions of interactions become automatised: we can become able to do many things at once, but not to gain conscious access to them all at the same time (Dixon, 1984; Underwood and Stevens, 1979).

Thus we have a cognitive psychology of skill: all skilled action (motor skills too) involve internal bases for systematic anticipation and responding, though some skills may be "more cognitive" than others in that their very goals and processes are defined in representational terms, for example thinking itself (Bartlett, 1958).

IPS notions have recently been taken up as a way of illuminating the nature of classroom teaching competence as well as decision-making which is presumed to inform it; what an often dualistic common sense (not to mention the educational research tradition) tends to see as separate, cognitive psychology reveals as aspects of the same complex process. Thus classroom management and instruction have been sees in IPS terms (cf. Doyle, 1979, 1983), with workers such as Leinhardt now analysing the relatively automatised action sequences and routines which characterise expert as opposed to novice teachers (Leinhardt and Greeno, 1986; Leinhardt, Weidman and Hammond, in press). Data on the increased cognitive differentiation and integration of experienced and relatively expert teachers (cf. Calderhead, 1981, 1983; Clark and Peterson, 1986; Housner and Griffey, 1986) are very much consistent with IPS psychology.

Skills psychology also illuminates certain aspects of recent research on teachers' interactive decision-making. The automatising and hierarchical compiling of action and sub-action schemata in the course of skill acquisition would lead us to expect limits on the extent of conscious accounts by teachers of their teaching. It comes as no surprise, therefore, that according to Clark and Peterson's 1986 review, conscious decision-making occurs in only about 25 per cent of teachers' reported thoughts and at an average of about one conscious decision every two minutes. As has been pointed out (Tomlinson, 1986; Yinger, 1986), this means that much other important teacher action is probably going on than is recalled and that the much favoured research technique of stimulated recall fails before some of the "sticky methodological issues" Yinger (1986) sees in research on interactive teaching. Though as his paper goes on to show with detailed applications, cognitive psychology itself does offer a well-grounded framework for dealing with such methodological issues (cf. Ericsson and Simon, 1980).

However, the respect in which IPS approaches may have their finest role to play, directly or indirectly, is surely that of enhancing effective teaching. Directly, via the possible application of its insights into skill acquisition. Somewhat less directly, through analysis in IPS terms of the activities characterising effective teaching. Since my immediate concern is to provide a framework, let me comment first on the latter possibility.

As Berliner (1986) has pointed out, the pragmatist tradition welcomes the study of processes, but does not forget that effectiveness is the goal. The IPS tradition

has always been interested in both. If teaching is to be seen as skill, then it is clearly a very open, complex skill. Therefore, whilst one must welcome the detailed study of effective teachers in comparison with ineffective and novice teachers (cf. Leinhardt's recent work), we shall have to be careful about deciding when we have a sufficient characterisation of the structures of teaching skill to function as a prescriptive basis for enhancing teaching competence.

This point involves at least two considerations:

(a) The first and more general is that is is difficult to decide what is to count as expert teaching. Apart from the difficulties with the concept of teaching itself (cf. Fenstermacher, 1986; Greene, 1986), pinning expertise down empirically is no less straightforward. For instance, a recent and beautifully detailed study of instructional interaction in British infant school classrooms (Bennett et el., 1984) found various forms of task mismatching and non-diagnostic approach. This was amongst teachers who had been nominated as outstanding by their principals and school systems advisors! This is, of course, one of the limiting features of empirical study as a basis for improvement of any function: it's always possible it could be done even better!

(b) Even when we are happy with the expertise indicators (e.g. Leinhardt used "unusual student academic successes" as well as "convergent nomination from principals and supervisors"), then we must remember that teaching is an exceedingly open skill. It cannot be reduced to a mere concatenation of behavioural acts. Nor, therefore, can it be "proceduralised" and inculcated as a set of habits. We must not forget, for instance, that Leinhardt's action structures are "goal-directed" and thus flexible, and even the more detailed "routines" are "co-operative scripts" involving interaction between teacher and pupils. Thus her reference to teaching as the "educational dance" is more than just a charming metaphor. It characterises an interplay whose discernible patterns are but potential ways of sufficing to fulfill its design, not necessary essentials which exhaust its openness and freedom. More might and ought to be said about this were the present paper dealing only with issues in the application of IPS psychology to teaching. The above remarks appear a minimum necessity in view of the tendency of some people to view RAP as implying the "robotisation" of teaching.

When we do decide what might be useful ways to go about teaching (and as in any other practical enterprise, we cannot but proceed using best current resources, however limited), then as the first of my earlier pair of points indicated, we may wish to consult IPS skill acquisition insights. The basics of skill learning as sketched above tend to imply (cf. Smith and Tomlinson, 1985) both that learning to teach must be centrally situated in active attempts in the classroom, and that such activity must be reflective, providing for the obtaining and utilising of relevant feedback and the promotion of active processing by student teachers.

It may be noted that these points are highly consistent with recent emphases on professional expertise as "reflection in action" (much of which is described as implicit or intuitive) as opposed to "technical rationality" (Schön, 1983). As Yinger (1986) suggests, they point to the need for multi-method, including participant, research if we are to adequately access the thinking-in-action that is the open skill of teaching.

However, the present paper is concerned with an approach designed to enhance teaching competence through classroom application of skill acquisition insights. We may summarise the earlier outlines of these in diagram form as shown in figure 1. below.

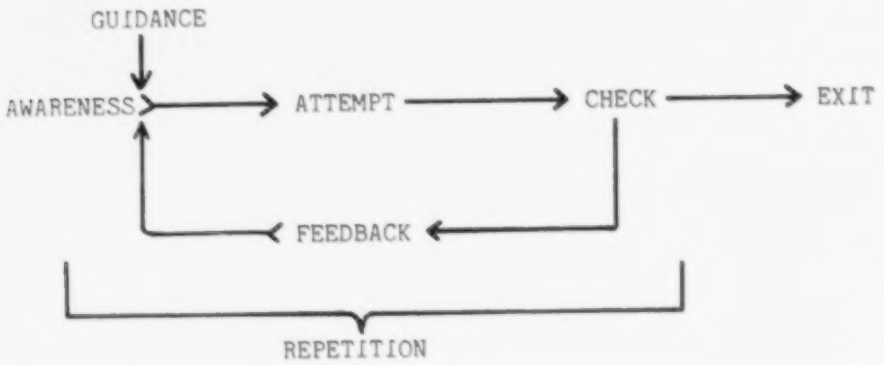

Figure 1. Skill acquisition through meaningful practice

Skill acquisition poses various difficulties which are well exemplified in learning to teach. First, there is the usual problem that the novice needs to gain cognitive resources that are well beyond their limited information capacity; awareness, "getting an idea of what to do", takes some learning. Second, there is the well-known problem in skill acquisition that even insofar as one does have a relatively adequate notion of how to go about things in theory, "getting it together in practice" is also well beyond the processing capacities of the novice. This requires skill learning per se, in what Fitts referred to as the associative phase.

Practices in the supervision of student teachers' first teaching experiences in Britain suggest that recognition of provision for these difficulties is rather patchy and vague. The need for prior awareness is perhaps more generally recognised, with students being typically expected and assisted to go through their teaching episodes with some plan of action. Needs for feedback and guidance also seem to be acknowledged, though they tend to be dealt with only in a rather general and informal way, through discussion before and after relatively extended teaching sessions, usually of at least thirty-five minutes.

There is the possibility of powerfully direct and immediate feedback through the use of videorecording, which is greatly assisted by analytical help from a sensitive supervisor (cf. Stones, 1984). And although microteaching arose from a Behaviourist tradition, it may be argued that its strength is that it potentially fulfills some major IPS principles: in particular, the provision of direct feedback under conditions which promote its application to subsequent action and a lowering of the complexity faced by the novice. However, apart from the problems of transfer to real-life settings, microteaching still fails to provide the guidance which can be so useful in the early stages of continuous, complex open skills such as teaching. The problem is that even if the student has relatively adequate preactive awareness of goals, strategies and tactics, he or she is likely to find difficulty "getting it together" when faced with the more complex stresses of the real classroom.

In many areas, e.g. sports skills, driving, novices can be helped through the early phases of skill acquisition by ongoing guidance as they make their attempts. Clearly, overt guidance is impossible in any communication-based activity such as teaching. However, the present author's experience in supervising students' teaching practice confirmed the IPS emphasis on the need for guidance during ongoing teaching to assist students to translate thought into action in the classroom "where it matters".

RADIO-ASSISTED PRACTICE (RAP)

It was in this context that the idea occurred to me of using miniaturised radio equipment for unobtrusively communicating guidance to student-teachers during ongoing teaching in the natural situation. Preliminary studies confirmed its feasibility (Smith and Tomlinson, 1984). Although this radio-assisted practice (RAP) was initially referred to as a technique, it was realised that the actual activity of speaking into a microphone at the back of the classroom can only be useful if intelligently embedded in a well-grounded theoretical framework. These come mainly from IPS psychology, as sketched above. Thus the RAP concept is of a technique-informed-by-principles. These principles are currently seen as follows.

1. Intelligent Teaching - Mutual Respect

RAP is intended as a support for the development of intelligent teaching by independent human beings, rather than any sort of "inculcation by radio control". That is, tutor and student teacher should see each other as autonomous collaborators in the joint activity of enhancing the student's classroom teaching competence (and the tutor's "rapping" and supervisory competence!). This has at least two further implications. First, more positively, it means that the tutor must be appraised of the student

teacher's teaching intentions, which will require at least brief discussion before any session in which rapping may occur. The deeper the shared background concerning teaching strategy analyses between tutor and student, the better. The second, more limiting implication is that the student teacher must be free to accept, ignore or reject RAP inputs and the tutor must respect this in intelligently sensitive ways.

2. Promoting Student Independence

The main function of RAP is to support the learner teacher with guidance of various kinds (see below). Yet this is precisely intended to promote their independence in at least two respects: (a) to assist them to become independent of such help in their teaching competence; (b) to promote their independence as learners of the craft of teaching. It must be admitted that there is something of a tension between these two aims, particularly when one remembers how anticipatory teaching has to be, and therefore how RAP guidance might need to anticipate such anticipation! The resolution of this dilemma seems to lie generally in ensuring that student and tutor share the preactive thinking and planning, as well as feedback and reflection. More concretely and with respect to actual rapping activity, tutors should let students show that they need help to translate ideas into action. This means waiting until the student teacher shows consistent failure to bring in a planned strategy under appropriate circumstances. It also suggests that in terms of any hierarchy of strategies and more specific sub-skills, tutors leave students to do some of the processing involved in translating a relatively general strategy suggestion into specific action. It might also mean on occasion simply bringing information to the "rappee's" attention, so that (s)he can act on it.

3. Strategic Flexibility

There is also a tension between the openness and flexibility of teaching skill and the need for concrete support in undertaking such a complex activity. This is reflected in a similar dilemma for RAP usage. Namely, such support needs to be concrete enough to be of use, yet not so specific as to preclude broader application. A similar solution appears to be called for. Namely, insofar as one discerns a hierarchy of teaching strategies and tactics, action structures and routines, skills, subskills, sub-subskills....., one ought to input suggestions at the most general level compatible with practical assistance to the student. This and the previous principle nevertheless require application in conjunction with the following rather basic requirement.

4. Non-disruption of Ongoing Teaching

The major reason for using miniaturised radio equipment is so as to avoid de-naturing the teaching situation. An obvious extension of this principle is that the communication involved must in no way disrupt the student teacher's teaching activity. This

has in turn the more concrete implications of (a) the general need for very brief inputs using an economical vocabulary of RAP messages, based in the analysis of teaching shared by student and tutor; (b) the need for these inputs to be meshed with the student's activity (the cognitive psychology of selective attention should be of help here); (c) the need for tentativeness and sensitivity on behalf of the rapping tutors, particularly in the early stages.

5. Learning the Ropes

The above makes clear the "rapping" is going to be every bit as complex and open a skill as the activity the "rapper" is seeking to support. Tutors and students will bring enormously different skill and insight resources to it, and must respect the complexity and potential difficulty of the approach. In some areas they may be pleasantly surprised by a lack of difficulty, in others daunted by unforeseen problems. Given the power of RAP communication to affect ongoing action in various ways, it is therefore important to realise that one is learning a new and complex skill, so that tentativeness should be the order of the day.

The above principles give rise to the following "RAP rules of thumb" for tutors using the approach. Each should be prefaced by "Other things being equal....."

(1) Discuss things in advance with the student
(2) The student-teacher is in charge
(3) Let the student show the RAP input is worth making
(4) Use known terminology
(5) Keep inputs brief
(6) Mesh inputs with the student teacher's activity
(7) Don't nag
(8) Be especially tentative in the early stages
(9) Don't tell them if you can get them to find out for themselves
(10) Make your messages more general than you were first inclined

Turning to inputs themselves, RAP inputs may fulfill the following functions:

(1) Guiding/Suggesting: Where the tutor cues or prompts the student to do something thought to be in their repertoire (examples: "Circulate", "write it on the board"; or more indirectly, "did they understand?")

(2) Giving Information: This may be (a) general: where the RAP tutor points out something relevant that isn't being picked up (example: "pupil asleep at the back") or (b) specific feedback: where the tutor informs the student of the results of an action (example: "they've misunderstood you"). In both cases the tutor could use the category (1) and cue the student to find out for themself (examples: "scan the back", "have they understood?")

(3) Giving Reactions/Evaluations: The tutor comments on the success or otherwise of a student action (examples: "Good positioning", "nice scanning").

There would appear to be a range of possible styles of "rapping", one dimension varying from "opportunistic rapping" to"systematic-sequential". The former indicates an approach in which the tutor makes inputs as and when the occasion demands, varying across whatever aspects the student is capable of understanding. Whilst this more open style would appear less in danger of violating certain RAP principles (e.g. 1 and 3), it is in many ways more difficult. The alternative extreme, "systematic-sequential" involves focussing on particular strategies until they appear to become established in the rappee's action repertoire. There are obviously many possibilities in between these two extremes.

THE CURRENT RESEARCH PROJECT

A research project on "The potential of Radio-assisted Practice in Teacher Education"[2] is currently underway at the School of Education, University of Leeds, U.K. Its major aims are to investigate:

(1) The effectiveness of RAP for student-teachers in initial training, with particular respect to certain aspects of classroom management and concept instruction.
(2) The extent to which tutors may profit from particular forms of initiation into RAP.

A secondary concern is to investigate teacher educators' construals and reactions with respect to RAP.

Design of the Research

Given the complexity of the issues and the problems of real life curriculum innovation, it was decided to adopt a broadly triangulatory or multi-method approach on various levels. The main framework would be quasi-experimental but the use of a variety of data-gathering approaches allowing considerable depth of focus would hopefully yield data more typical of what are usually referred to as case studies (Cohen and Manion, 1986).

In the event, a delay in the commencement of the 18-month project has imposed considerable readjustment in its planning, though it also made possible a previously unenvisaged pilot phase. However, equipment delivery problems have severely curtailed this pilot phase and the data currently available: case studies are certainly all we have at the point of writing. In view of this, what follows will first present the main study as designed. Following this will be brief accounts of (a) the study of teacher educator construals of RAP and (b) the pilot study of RAP activity, with indications of the findings so far.

(1) MAIN STUDY

Here the intention is to study the efficacy of RAP experience for students as well as the potential effects on RAP efficacy of differing levels of tutor initiation. Additionally, we are interested in potential effects of "rapping" on views and teacher education pedagogies of participating tutors.

"Treatment Conditions": The first of the above aspects will involve three student teacher conditions: (a) those receiving RAP guidance; (b) those supervised by the same tutors as the previous group but not experiencing RAP; (c) students being supervised by other tutors who do no "rapping" at all.

Three tutor initiation conditions are envisaged: (a) tutors receiving written guidelines and practical training in microteaching sessions; (b) tutors receiving written guidelines only; (c) tutors receiving only equipment operation instructions. Whilst the ecological validity of the latter two conditions seemswell grounded, theoretically, the complex nature of rapping skill would argue a need for thorough initiation, and thereby raised doubts about the ethics of including tutor condition (c). In addition to this, tutors' own wishes regarding their training would have to be respected. The time unit involved would be that of the teaching practice sessions involved in the participating institutions. This varies from a five-week block to the more typical school term, lasting some ten weeks.

Participants: Staff and students at the University of Leeds School of Education as well as four of its affiliated Colleges of Education and Higher Education. These cover both primary and secondary levels and operate their teaching practice at varying times during the year. Numbers participating will be limited by various factors, including the voluntary nature of the exercise and the equipment available.

Equipment: It was initially planned to use 12 one-way minature radio communication systems (EDC Minkom MTPX pocket transmitters and MRX/D pocket receivers with requisite earphones and microphones). However, it has since been realised that systems allowing simultaneous two-way transmission are required if tutors are to monitor distant individual interactions as well as whole-class teaching. A number of two-way systems have therefore been ordered. A receiver has also been adapted to allow feed-in to audio or video-recording equipment, yielding a record of RAP inputs as "voice-over". This will henceforth be referred to as a "voice-over receiver".

Data Gathering: Effects of RAP experience will be tapped in a multi-method fashion, including: (1) Direct observation and videotaping of double-lesson sessions at beginning and end of the intervention period (videorecording is necessary since the content of RAP inputs cannot be known precisely in advance); (2) Supervising tutors' interviews and written reports of their students progress; (3) Students' own interview and written reports of their progress. In addition, tutors will be interviewed concerning

any effects of RAP participation appears to have had on their general approach to supervision and teacher education, and corroboration of this will be sought in data available from their "non-rapped" students.

The nature of RAP activity will be monitored by means of: (a) Tutor written logs recorded during lessons, plus interviews; (b) Student records completed, where possible, immediately after lessons, plus interviews; (c) Direct observation and video-recording with RAP voice-over of a sample of sessions in which RAP is used, with interviews on these.

(2) TEACHER EDUCATOR CONSTRUALS OF RAP

Given the theoretical potential of RAP in teacher education, it also seemed worth investigating the reaction of teacher educators to a "realistic standard introduction" to the concept. A study was commenced in which staff colleagues involved in teaching practice supervision at the institutions mentioned above were sent copies of the Smith and Tomlinson (1984) introductory article on RAP and invited to seminars on the topic by myself. The seminars follow a standard format in which the concept of RAP and the research project are briefly introduced. A 25-minute videorecording with voice-over of the RAP technique in action is shown with a commentary from the speaker; discussion ensues.

Subsequently interviews were commenced with those staff colleagues willing to give some 45 minutes of their time. Carried out by myself or Dr. David Swift, these "focussed interviews" aim to uncover respondents' construals of RAP with minimal framing (cf. Driver and Erikson, 1985), whilst nevertheless ensuring that an essential agenda of issues is covered. This is achieved by using a hierarchy of questions (see Appendix 1) with the general rules that the interviewer: (a) refers only to what the respondent has already said, noting which questions he or she has spontaneously covered ("s"), and requests extensions where appropriate; (b) when necessary, asks questions from the schedule at the highest level of generality possible, noting which issues have had to be mentioned (prompted, "p"). In this way, as Appendix 1 shows, teacher educator colleagues were queried as to their views on aspects of: the nature of RAP; its possible effects, positive or negative; the factors influencing its effects; comparison of RAP with microteaching. The style of these interviews is decidedly non-directive and they are taperecorded with the respondent's permission, with an option to wipe the tape if in retrospect this appears necessary. Confidentiality is assured.

Preliminary Results: Some 18 interviews have been completed so far: there have been three (temporary) refusals and one refusal to have the interview taperecorded. This sample is so some extent biased, since the first colleagues followed up were those who

had either attended a seminar or otherwise indicated their interest in aspects of practical teacher education. Interviewing continues. Completed interview tapes are in the process of transcription. Detailed analyses have not yet been undertaken, but the following broad trends emerge:

(1) There is considerable variation in what people understand by the RAP concept. Virtually all claim to have read the article supplied, but they vary in what they take from it. Some have virtually "given back" its contents, whilst others seem to have assimilated it to their own pedagogy of student teacher development, which often appears highly "mentalist".

(2) So far most interviewees appear to appraise the RAP idea positively enough to think it worthy of trial, often linking it with their own experience in beginning teacher supervision. Various sorts of qualifications have been offered, with some very sceptical of RAP potential. Such negative stances have included "barriers to the personal relationship between student and tutor" as well as uncertainty as to the sorts of things one might usefully say "down the microphone". Disruption of student activity by RAP inputs tends to be a typical fear, but those who have seen the video-recording of it in practice tend to be surprised by the clear lack of disruption evidenced.

(3) Responses concerning factors likely to influence the effectiveness of RAP tend to suggest a rather general model of the person at the centre of interviewees' pedagogies. References tend to be made to the quality of the relationship between tutor and student, as well as to disruption possibilities of RAP inputs. There sometimes seems to be a sort of underlying view, evident in some interviews as well as general conversation with colleagues, that one ought not to "lay too much on students", with RAP being implicitly seen as imposition rather than support (or if the latter, than one can still have too much of it!) The impression is of a rather global "naturalism/non-interventionism" regarding the emergence of teaching competence in novices.

(4) Comparisons of RAP with microteaching and the concepts of the latter emerging from the interviews likewise show considerable variation, but also tend to indicate a relatively global level of conception of both. An idea of this level is perhaps indicated by the finding that at the level of terminology, the term "feedback" is used about as often to refer to the major function of RAP (anticipatory guidance) as it is for that of microteaching (retrospective video information).

Whilst these findings are based on a relatively small sample, they do appear to confirm that RAP has some potential in the minds of experienced teacher educators. It might

also be mentioned that many of the more detailed points emerging (e.g. possibility of student dependence on radio guidance) were being anticipated in the RAP guidelines we were concurrently preparing. From these interview findings it would also seem likely that on average teacher educators will require careful initiation into RAP usage, which will require both the setting out of a relatively sophisticated set of principles of skill acquisition as well as the guided opportunities to develop the higher-order skill of rapping themselves. It also seems likely that such focussing on the practical details of ongoing teaching activity will require (and hopefully be the occasion for enhancing) considerable development and differentiation of many of their current ideas regarding the teaching activity they are charged with enhancing.

The above points are of course based on the verbal formulations of interviewees. As argued earlier in considering stimulated recall, however, some aspects of skilled competence may defy conscious access, let alone verbal articulation. Tutors might possibly be able to RAP in spite of difficulties with their espoused theory communication, the more optimistic possibility being that RAP might allow a short-circuiting of teaching competence from expert to novice. On this view, the tutor would simply rap the novice to do what her or she (the tutor) finds themself wanting to do in reaction to that teaching situation. Rather like someone being given a lift home by a friend who doesn't know their familiar route, they would probably raise their own psychomotor routines to the grasp of consciousness (cf. Piaget, 1976) rather than think the route out "theoretically". Some such "direct transmission" view appears to underlie the very positive reception RAP has tended to receive informally amongst teachers introduced to it. Whilst these construals remain to be investigated systematically, I am sceptical of this view on various grounds. For a start, RAP guidance requires verbal communication anyway, and more basic still, such an approach seriously violates some of the RAP principles derived above from its status as an open skill. In this respect, it appears that some of RAP's best friends may in fact be its worst enemies, insofar as their friendship is built on an over-simple, inculcatory view of competence acquisition. However, the nature of rapping processes is very much part of the focus of the remainder of the present project.

(3) PILOT STUDY

In advance of the 1987 Spring term teaching practice eight colleagues at the Leeds University School of Education (five in the secondary age range course, three in the primary) agreed to try RAP with a maximum of two of their supervisees, nominating a further student each as non-rapped "controls". They were asked to indicate which of the three tutors initiation conditions (see above) they would be willing to enter: all but two required practical training and the remaining pair preferred it.

A set of written guidelines (RAP, 1986) was prepared, comprising of the RAP principles, functions and rules of thumb outlined at the beginning of the present paper. In addition, a possible basis for RAP vocabulary was offered in the form of two "RAPmaps", consisting of a hierarchical taxonomy of possible class management strategies and a system-like portrayal of concept instruction (see Appendices 2 and 3). An alphabetical glossary of the terms involved was also prepared. The purpose of these RAPmaps was to highlight the multilevel nature of teaching skill and it was made clear that they were offered only as one possible basis for a RAP vocabulary, whose usage was optional. Two tutors were given only the RAP guidelines, it having been agreed that they would negotiate their own RAP vocabularies based on a "phenomenological approach" to their students' perceptions. Tutors were introduced to the materials involved in a pair of sessions which included practical initiation into RAP usage. This took the form of rapping each other and the present author in microteaching sessions, the use of video with RAP voice-over enabling various forms of feedback as a basis for reflective discussion and further trials.

Students nominated by their tutors as "rappees" were introduced to the technique in a session opening with a brief videorecording of the technique in action. The student teacher featuring in the video was on hand to answer students' questions about RAP experience. The guideline material, RAPmaps and glossaries given to tutors were also given to their students (the RAPmaps and glossaries only to the "non-rappees") in order to emphasise the openness of the exercise. They were provided with a radio transmission set and encouraged to send and receive messages to each other during the session. The voluntary nature of participation in the project was stressed and it was pointed out that early and late practice videorecording would be involved as part of the research. No students declined to proceed with participation.

Videorecordings were made of unrapped teaching sessions of a total of 18 students during January 1987 and tutor and student RAPrecord forms were produced. A major setback was then encountered in the form of the persisting non-delivery of the requisite radio equipment! A further one-way transmission unit was obtained during February, bringing our total to two, so that the pilot study data on the actual experience and outcomes of RAP usage is restricted to its application by five tutors, including the present writer. Eight student teachers were involved: five secondary (one joint English/French, two English and two History specialists) and two students at primary level. These tutors and students completed RAP record forms respectively during and after lessons, and the majority have been interviewed using a focussed or "open/agenda based" approach as described earlier for the teacher educator construal study and shown in Appendix 4.

FINDINGS

(1) Initial Stances

TUTORS: As reported, tutors generally preferred to receive some practical induction into RAP usage, though a small minority were willing to rely only on written guidelines. Similarly, all but one were prepared to go away from the brief training session and gradually learn rapping skills with possible assistance from the materials provided. The exception was the tutor who requested specification of a small number of "key" specific terms. In their initiation session, tutors tended to be somewhat surprised by their capacity to receive well-meshed RAP inputs without disruption. Generally, this session to "set them thinking" rather positively about trying the approach, and the research team's frustration at the lack of equipment was exacerbated by some of these colleagues' subsequent reminders that they were ready to go! One got a strong impression of the novelty of the RAP idea in practice for these colleagues and of its stimulating them to think of student teacher supervision in new terms.

STUDENTS: Initial reactions to the RAP concept as presented in the introductory sessions were characterised by two contrasting themes. On the one hand,interest in and appreciation of the idea of direct guidance support in an activity regarding which they tend to have considerable self-doubt (particularly with respect to classroom management). On the other hand, apprehension about its operation in practice. This stemmed from an expectation of their teaching being disrupted by RAP inputs. which in turn appears grounded in an intuitive cognitive psychology stressing the limits on conscious processing and forgetting the automatised, parallel, unconsciously embedded nature of much of the skilled action that characterises everyday life. This apprehension also appears to be connected with a more general fear of evaluation, which in turn seems to be elicited all the more strongly by the direct access and specificity of focus associated with RAP. Whilst these reactions need further investigation, their importance can hardly be overestimated. Source credibility would therefore appear to be vital when introducing RAP to potential participants, particularly receivers. An articulate former student from the same teacher education course, reinforcing the concrete evidence of the video-tape in which she herself featured as the "rappee", seems to have been an effective component in the student introduction, though it must be remembered that no alternative approach was tried.

(2) The Rapping Process

TUTORS' ACCOUNTS: From the available Rap record forms, the rates of input were as follows: two tutors showed average input rates of one every two minutes, two tutors showed one every three minutes, and a rate of one input every five minutes was shown by the record of the tutor who had negotiated his terms solely by reference to his student's perceptions and suggestions. Of these same tutors, four showed use of praise, with one using this category in more than two thirds of her inputs. The exception was again the negotiation-based tutor, who used no praising inputs at all. This was perhaps not surprising, since the vocabulary they had arrived at contained no such terms.

Tutors' use of particular vocabularies varied somewhat. Two stayed almost exclusively with RAPmap terms; one based herself on the RAPmap, but developed some new terms in connection with areas she and her student thought important; another with RAPmap apparently used none of its terms; the final tutor, as mentioned, developed his own vocabulary with his student. This showed some overlaps with the RAPmaps (e.g. "patrol" for "circulate", "concentration" for "monologuing"), as well as the idea of a "place-grid" dividing the classroom into reference areas. There did not appear to have been very much time spent in specific pre-lesson preparation between tutors and students, in spite of the stress on this in the guidelines.

In their RAP record notes and subsequent interviews, tutors reported RAP as straightforward to carry out, with the completion of RAP record forms possible at the same time. So much so, in fact, that in one case a tutor also reported early on that he had had a feeling of "not keeping up a reasonable input rate" (his realisation of the false assumption embedded therein was firmly reinforced!). Unfortunately, no tutor eventually rapped any student over more than two double lessons; but even after their first sessions tutors reported that RAP activity focussed them more strongly on their students' tactics and strategies - in one case even more than she had realised was necessary when she had discussed areas requiring attention with the student. Two out of the three tutors interviewed said that even within their first two sessions using RAP they found themselves taking students' competences less for granted and became more analytical. There was a reported tendency to start with an opportunistic approach, but to find themselves using a limited number of aspects, with something of a drift towards what was earlier termed systematic-sequential RAP. There was explicit confirmation from three of the need for economy of messages. This must, however, be taken in conjunction with the inhibition these tutors experienced in small rooms, when the class was quiet, and when student teachers were holding the floor, as in reading or whole-class announcements. Tutors reported that students almost invariably implemented the suggestions communicated to them, though there were two interesting exceptions to this. One was a student who insisted in post-lesson discussion that she had indeed

been scanning when asked to do so by her tutor in a RAP input. The other was a student I myself was supervising with use of RAP: she was a very reflective person, but had difficulty in actually doing things she quite positively agreed to be of use in pre- and post-lesson discussion, unless they were very concretely expressed.

STUDENTS' ACCOUNTS: From Rap record forms completed immediately after lessons, students appeared to be recalling only small numbers of inputs per lesson in comparison to the tutor record (see below). They were aware that there had been "some others", but none thought the amount of rate or input in any way excessive. On these post-lesson RAP record forms and in final interviews (see Appendix 4 for agenda sheet) they generally complained about physical discomfort and insecurity of the earpiece and mentioned initial difficulties with hearing pupils whilst rendered "deaf" on the earphone side. They found themselves acclimatising to this problem even over the short sessions involved.

Students tended to be a little surprised at the positiveness of their RAP experience. They were unanimous: (a) that in spite of the above difficulties it was not significantly disruptive of their teaching; (b) that it was useful; (c) that it would have been particularly useful early in their school practice; (d) that they had been able to think about RAP inputs as received and had in fact done this; (e) that they particularly welcomed the positive evaluation and praise. There was some tendency to downplay the importance of some of our more favoured specific inputs, such as "scan", such students saying either that these details weren't that important or that they were doing it anyway. Probably related to this finding was their tendency to recall as RAP inputs more global-functional items that were likely to exist already in their previously acquired schemata of classroom interaction (e.g. "trouble in the back corner").

Thus as well as specific details of process, student accounts bore testimony to the motivational and self-presentation concerns of beginning teachers. As other evidence showed, the student who wrote "The main positive point was the lack of worry about what critical points were being written down about me'" was exceptionally judgemental of herself and correspondingly defensive; but her remark summed up the intimations of most of the other student participants.

COMPARISON OF TUTOR AND STUDENT ACCOUNTS: As indicated above, students seemed to be recalling only a small proportion of RAP inputs. RAP record forms for tutors and students showed, for instance, that student CK recalled five inputs from a double lesson lasting some 70 minutes in which his tutor recorded 32 inputs and that student EE recalled nine from the 20 inputs recorded by her tutor over 35 minutes. Recalled inputs tended to be concerned with significant tactics and strategic actions, and would therefore be candidates for conscious processing and subsequent recall (cf. Ericsson

and Simon, 1980; Yinger, 1986). Although most students mentioned most of the categories recorded by their tutors, they seem to have been only marginally aware of many of these other inputs, which appear to have become lost in the flow of their classroom action. This is corroborated from my own experience, when I noticed from the log of input times on the sheet before me that I had been going at a rate of about one input every two minutes. I therefore asked the student immediately after the lesson how she had found the amount of input and whether it was possibly rather a lot. She seemed somewhat surprised and denied finding the input rate or amount high, and repeated this on her written record form. On the other hand, another student thought on one occasion that she had been doing more scanning than her tutor had credited her, so that some of his inputs were unnecessary. His view was that she did scan, but not as consistently as she herself thought and particularly when conversing with individual pupils. The post-interview comments of this rather defensive but highly articulate student underline the constructive, motivationally influenced nature of human cognition-in-action, and indicate the powerful, two-way interactive power of video feedback and RAP guidance.

(3) Effects of RAP

IMMEDIATE EFFECTS: Students were very clear that they felt in control of the situation and able to think about RAP inputs as suggestions to be decided upon, rather than experiencing them as irresistible behavioural prods. On the other hand, they do seem to have responded to the majority of inputs with action compatible with them, and one student made the point that a RAP input at the very least alerts the recipient and then orients them towards something in the setting. This is confirmed by my own experience of "being rapped" whilst piloting the interview plan shown in Appendix 4. However, this central issue concerning the actual processes of RAP guidance certainly requires further investigation utilising videotaping with voice-over, as described earlier.

Even during a brief amount of RAP supervision involved so far, tutors noted the need for economy and, above all, relevance of vocabulary. One of my own students, for example, appeared to require particularly specific cues. Her incapacity to translate even relatively concrete suggestions was surprising in view of her spontaneous request for practical help, her positive stance regarding RAP, and above all her reflectiveness and sensitivity in analysing her own and others' teaching. In spite of this, she was very much a "in a mess" regarding classroom management and effective teaching. This seemed due to at least two factors, possibly related. First, she has a general manner that is very quiet and retiring, suggestive of a basic temperamental style. Second, her assumptions tended very strongly towards the implicit "benign rationalism" ("they'll be reasonable if I'm reasonable") I suspect to be built up in the relatively genteel

culture of the university, perhaps particularly in English departments. This particular case underlines the message emerging from theinvestigation as a whole so far: that RAP can only be of benefit when informed by a very full discussion and reflection on the processes involved in effective teaching.

LONGER TERM EFFECTS: Clearly the length and number of sessions experienced by the students in the study so far are insufficient to indicate what lasting promotion to the teaching activity repertoire requires by way of RAP experience. However, the preliminary video analyses to date seem to indicate that strategies and their subskills may "stick" even after relatively short amounts of rapping provided (a) they are focussed upon systematically, being dealt with more or less one at a time, and (b) that the circumstances in which they are appropriate can be clearly defined. It seems easier, namely, to get students adopting good visual vantage points and scanning visually when for instance, they approach individual pupils than it is to simply get them "scanning all the while". Clearly, this aspect requires the further work which is now in progress. What students did generally report in their interviews, however, was that even the "opportunistic" RAP support was useful and that they thought the experience had made them think much more seriously than they otherwise would have about the sorts of strategies, such as visual scanning, which had been the content of much RAP input. Once again, however, the effects of RAP per se on this must await comparison of rapped students with those who receive supervision using the same analyses and vocabulary but not RAP guidance as such.

DISCUSSION

Whilst it must be regretted that the present paper is even more of an interim report than had been anticipated, the above findings yield some lessons relevant to the overall aims of our research. Because the duration of actual RAP implementation has so far been restricted to a couple of sessions per student, we could not expect very much on the issue of lasting practical teaching effects. Our results relate much more to the process of rapping, though there are some possible implications for the effectiveness issue, albeit indirect and still tentative.

(1) In general there appears to have been strong confirmation of IPS or cognitive psychology as a framework within which to conceive of RAP, as argued in the introduction to this paper. That is, teaching may be seen as the skilful realisation of complex instructional purposes in open, ongoing interactions. Teaching is guided by internal schemata, though these are by definition those of the performer and much of the psychological processing involved is unconscious: in this way skilfulness overcomes some of our key information-processing limitations. In particular, our positive

findings regarding RAP reception and integration into the flow of action are consistent with this view and in contrast to the mind-body dualism characteristic of commonsense (mis)apprehensions of the disruptive potential of RAP inputs. They also illustrate how people bring their own skills and subskills to any new situation (such as teaching), with their own set of schemata and units of analysis. Thus, for instance, relatively detailed, specific subskills (such as visual scanning) appear to have become heavily embedded within the hierarchy of schemata, leaving conscious concern for relatively broad teaching and management functions. Beginning teachers thus tend to have a series of constituent teaching subgoals (e.g. "keep them quiet", "keep them interested"), but these tend to be more a set of "achievement words", as Ryle put it, than process plans. Thus the present findings strongly confirm the need for matching one's teacher education strategy to one's students and their starting points (cf. Tomlinson, 1981) and for the use of concrete material such as videorecordings of their own teaching as bases for such analysis. To this, crucially, must be brought some conception of possible teaching strategies. As Yinger (1986) pointed out when discussing Clark and Peterson's model of teaching, it's the boxes marked "teaching processes" that really need the unpacking. Thus the RAP idea, which to some can seem "purely" practical, touches the interface of plans and action. It therefore requires a framework which, in turn, includes as basic constituent the pedagogy whose application it is designed to enhance. It is noteworthy (though not really surprising, giving our guiding framework) that an idea so concrete-sounding as RAP brings out the cognitive nature of action so heavily and diversely. By the same token, RAP must be seen as but one component within an approach to practical teacher education. As our work indicates, RAP and the use of videofeedback appear to have a combined power beyond either of their separate potentials, and this interaction works in both directions.

(2) A second general emphasis indicated by RAP work so far relates to the motivational stances involved. Whilst we must remember the small sample involved, both teacher educator interviews and RAP activity itself highlighted the motivational issues, which appear to centre around self-presentation. There was unanimous welcome for positive evaluation as well as some indication of defensive, though apparently unconscious, exaggeration by students of their own competences. In terms of classical pyschological paradigm, this might incline one to "reach for Rogers", but to this we should add some of the process insights of cognitive psychology, with its more differentiated conception of the person. That is, it would appear that respect of students' conscious phenomenology and self-appraisal must be sensitively communicated within a positive atmosphere. But we also need means of enabling students to acquire new concepts and strategies. It would appear that vido material could form an invaluable basis for

analysis and illustration of what these strategies might be and what the corresponding terminology would mean. In this respect, the work of Stones (1984) is of central relevance, though where he wishes in general to combine counselling psychology with concept learning theory, we would add the cognitive psychology of skill and its acquisition.

(3) At the level of detail, the work reported above so far suggests that as our guidelines suggested, pre-lesson discussion between tutor and student is of extreme importance, and that more broadly, prior discussion of strategies is crucial to beneficial use of RAP. In further work attention must be paid to acclimatising students to wearing earphones and to pinning down the actual processes occurring when RAP inputs are sent, received and responded to.

There is thus some support from the above work for seeing RAP as a very open, subtle, sensitivity-requiring, higher-order skill with potentially great payoffs, positive or negative. Whilst our pilot study has already begun to show short-term lessons for successful rapping, if this conception is indeed correct, it will take a good deal of usage and development at the hands of experienced and open-minded teacher educators for RAP to reveal its fullest fruits.

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As you see it, what does the RAP CONCEPT INVOLVE?
What would you see as its essence, key features?

- What sorts of thing might tutors be saying over the radio-link?

WHAT EFFECTS do you think RAP technique could bring about, positive or negative?

- On STUDENT teachers
  - While RECEIVING rapping
    - On teaching competence
    - On confidence/comfort
  - When NOT RECEIVING rapping
    - On teaching competence
    - On confidence/comfort
    - On understanding of
- On TUTORS
  - When supervising WITHOUT RAP
    - On supervisory competence
    - On pedagogical ideas and outlook

3) What do you think SUCCESSFUL RAPPING would DEPEND on?

- by way of RAPPING ACTIVITY
  - On what features of message inputs
    - quantity: how much is needed for real effect?
- by way of TUTORS' qualities?
  - Would training in rapping be needed for tutors?
- by way of STUDENTS' qualities?
  - Would student teachers need any prior preparation for RAP reception?

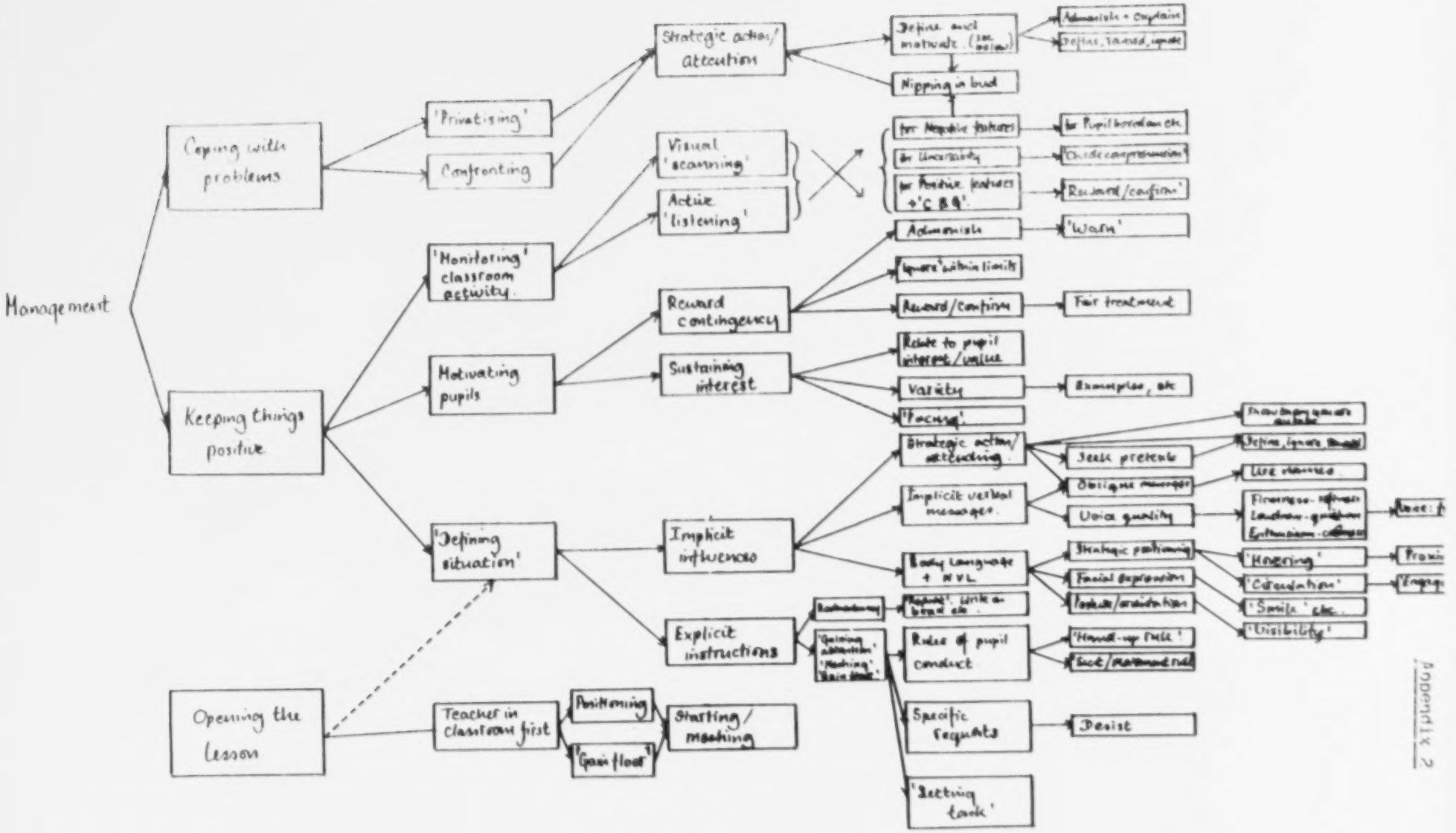
4) Can we briefly COMPARE RAP WITH MICROTEACHING?

First, what for you are the essential features of microteaching?

- How would you 'Compare and contrast' their essential features?

offer SELECTIVE TAPEVIPE OPTION

Class Management



Appendix 2

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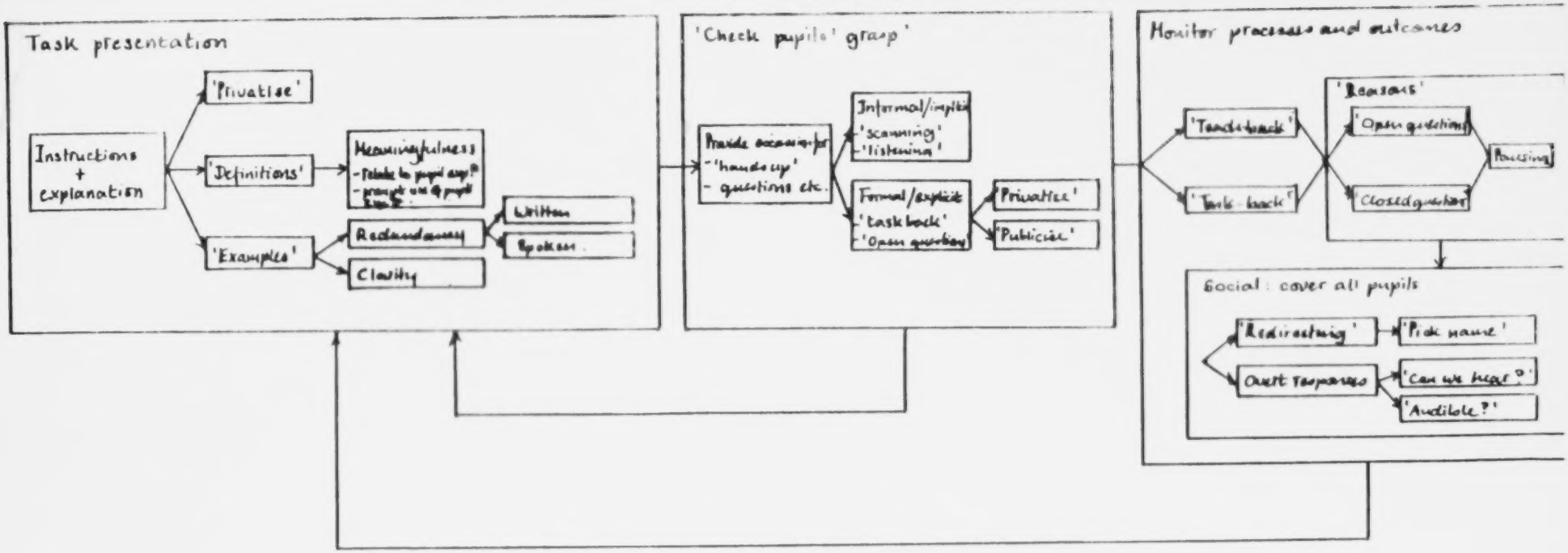
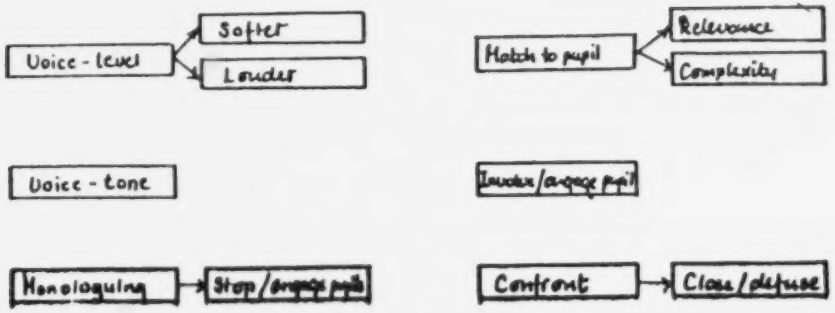
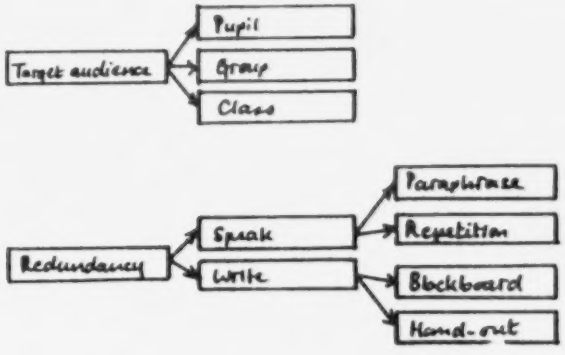
. . Concept Teaching . .



Permeation Issues.





Appendix 3

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POSTRAP STUDENT REACTION INTERVIEW

Introduction: These are not questions but an agenda of issues which you'll probably cover anyway...but just in case...

How would you describe the RAP experience you've just been having ?

- What's going on when you're being rapped ?
- To what extent did you find yourself thinking about the RAP inputs you received ?
  - How far is it possible to think about RAP inputs received ?
- How useful or otherwise did you find your experience of RAP ?
- How useful or otherwise did you find RAP inputs at the time they were given ?
- How disruptive or nondisruptive
  - How good was the timing of inputs?
- Did you feel you developed any dependence on RAP inputs
- Did RAP have any effects on your willingness to experiment in your teaching ?
- What if anything has your RAP experience left you with in relation to teaching ?
- Has it had any effects on your actual teaching ?
- Has it had any effects on the way you think about teaching ?
- How would you describe/evaluate the preparation you received for RAP ?
- How did you find the introduction by project staff
- How did you find the written materials (RAPpags etc)
- How did you find preparation by your tutor ?
- How useful for rapping did you find use of the video of your teaching

Date:..... Interviewed by:.....